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ONTARIO WATER
RESOURCES COMMISSION

ANNUAL REPORT 1965

TIMMINS

water pollution control plant

DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Timmins Local Advisory Committee,
Timmins, Ontario.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Timmins
Water Pollution Control Plant, OWRC Project No. 60-S-71.

We appreciate the co-operation you have extended to our Operations staff
throughout the year, and trust that continuation of this close association
will ensure even greater progress in the sphere of water pollution control.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager.



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.
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VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Timmins Water Pollution Control Plant, OWRC Project No. 60-S-71.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

A handwritten signature in cursive script, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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TIMMINS
water pollution control plant

operated for

THE TOWN OF TIMMINS

by the

ONTARIO WATER RESOURCES COMMISSION

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F. A. Voegelé A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'65 **REVIEW**

Total operating costs for Timmins Water Pollution Control Plant in 1965 were \$31,001.30. This was the first full year of operation at the plant.

Payroll accounted for the largest portion of the costs at \$13,545.17, while items such as power and sundry contributed considerably to the total expenditure. A total of 1,061.29 million gallons of raw sewage was treated at the plant at a cost of \$29.21 per million gallons or \$4.17 per family per year. The cost per pound of BOD removed was \$.03.

The average daily flow in 1965 was 3.07 mgd which was 0.07 mgd above the average design flow of the plant. The maximum design flow is 9.0 mgd. A reduction of 63.0% in BOD and 70.5% in suspended solids was obtained during the year.

Inspection by OWRC engineers and technicians found the plant well operated and maintained.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY

1956 - 1965

INCEPTION

In October, 1956, officials of the Ontario Water Resources Commission met with representatives of the Town of Timmins to discuss the financing, construction and operation of a water pollution control plant for the municipality.

The firm of Gore and Storrie Limited, Toronto, Ontario was engaged to prepare plans and specifications for the project.

APPROVAL

The Ontario Municipal Board granted approval for the plant in October, 1960.

CONSTRUCTION

Gap Construction Company Limited, North Bay, Ontario completed the outfall sewer in February, 1963. Tru-Line Construction, Limited, Scarborough, Ontario, completed the water pollution control plant in March 1964.

TOTAL COST

\$785,344.04



S. E. MATSON
CHIEF OPERATOR

Project Staff

Operators:

L. A. Robinson
M. R. Jasmin

COMMENTS

Mr. S. E. Matson was hired as Chief Operator in March 1964. Mr. Robson and Mr. Jasmin were hired as operators in October 1965. The staff have operated the plant in an efficient and satisfactory manner.



Description of Project

INFLUENT WORKS

Raw sewage enters the wet well of the treatment plant through a 36-inch diameter trunk sewer. An overflow man-hole ahead of the wet well by-passes flow in excess of 3 DWF through a 36-inch diameter overflow and outfall sewer into the Mattagami River. A manually-cleaned bar screen located at the entrance to the wet well removes large objects from the sewage. The wet well is provided with a sluice gate to facilitate its drainage and maintenance.

The raw sewage is then pumped to the screen chamber and then flows to an aerated grit tank by gravity. Particles accumulating on the fine screens which have $3/8$ inch clear spacings, are shredded by the rotating drum of the Barminutor. A by-pass channel, provided with a coarse bar screen, is used when

the Barminutor requires maintenance. The by-pass screen is installed in such a manner that it may be replaced by a second Barminutor at a future date. Air diffusers lines are installed in the screen chamber to prevent any sedimentation of solids.

Compressed air is forced into the grit chamber in such a manner as to impart a roll to the tank contents. The velocity of the roll is controlled so that the grit settles to the bottom of the hopper while the organic material stays in suspension and passes through the grit chamber. Accumulated grit in the grit tank hopper is carried by air lifts to a decanting trough where it is removed manually and trucked away from the plant.

PRIMARY SEDIMENTATION TANKS

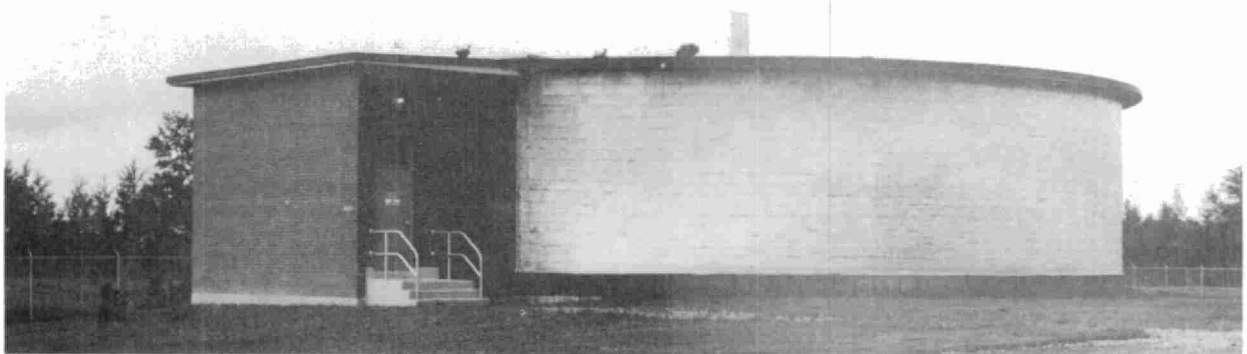
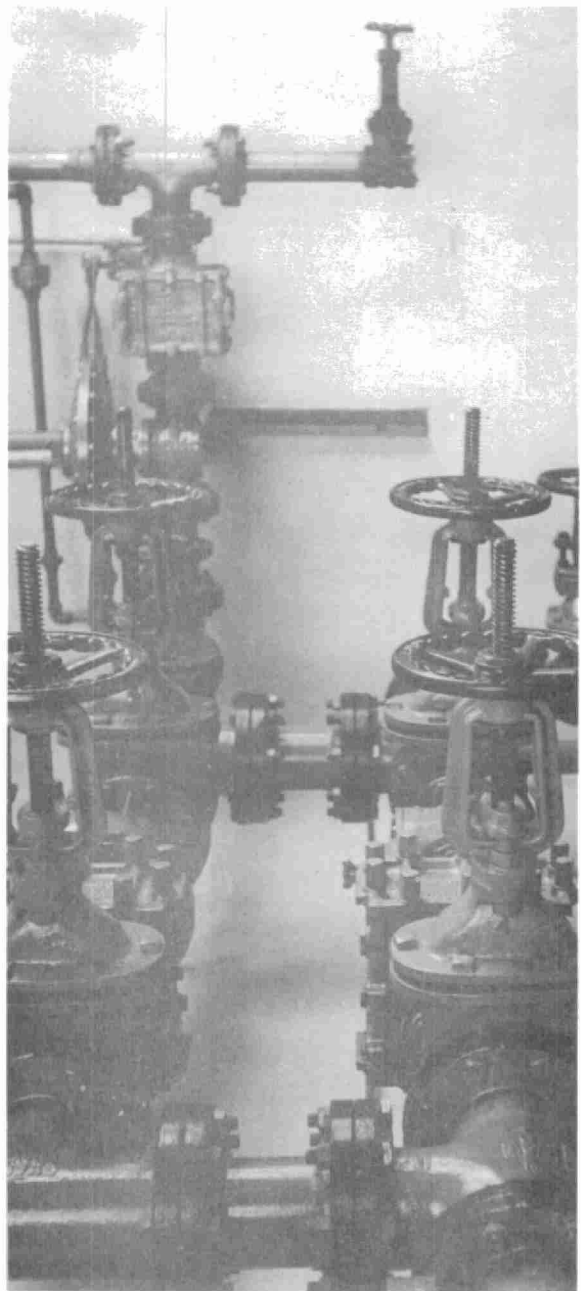
From the grit chamber, the waste is

directed to two primary sedimentation tanks through an aerated channel. Approximately 65 percent of the suspended solids settle out during the three hour detention period. Longitudinal sludge collectors move the settled solids to a hopper located at the front of the tanks where it is pumped to the digester by two raw sludge pumps. Scum formed on the surface is skimmed by the collectors to a scum channel and finally pumped to the digester by a chlorine contact chamber where it is chlorinated and overflows to an outfall pipe to the Mattagami River.

SLUDGE DIGESTION TANK

Single-stage digestion is utilized at the plant. Raw sludge is pumped directly to the digester and mixed thoroughly with the sludge presently being treated. A recirculation pump continuously circulates sludge to a sludge heater and back to the digester to maintain constant sludge temperature (adjustable within a range of 85° to 105° F). The recirculation suction pipes are set at four different elevations on the digester. The supernatant liquor overflows into a chamber located at the top of the digester and flows by gravity to the wet well in the Main Control Building. Digested sludge is drawn from the bottom of the digester and disposed of by a tank truck.

DIGESTER PIPING (AT RIGHT) AND BUILDING (BELOW). THE SINGLE-STAGE DIGESTER IS 65 FEET IN DIAMETER.



PROJECT COSTS

NET CAPITAL COST (Estimated)	\$785,344.04
DEDUCT - Portion Financed by CMHC (Final)	<u>521,108.36</u>
Long Term Debt to OWRC	<u>\$264,235.68</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965	\$ <u>9,788.81</u>
Net Operating	\$ 31,001.30
Debt Retirement	9,590.00
Reserve	5,398.00
Interest Charged	14,356.76
TOTAL	\$ <u>60,346.06</u>

RESERVE ACCOUNT

Balance at January 1, 1965	\$ -
Deposited by Municipality	5,398.00
Interest Earned	113.84
	\$ 5,511.84
Less Expenditures	-
Balance at December 31, 1965	\$ <u>5,511.84</u>

MONTHLY OPERATING COSTS

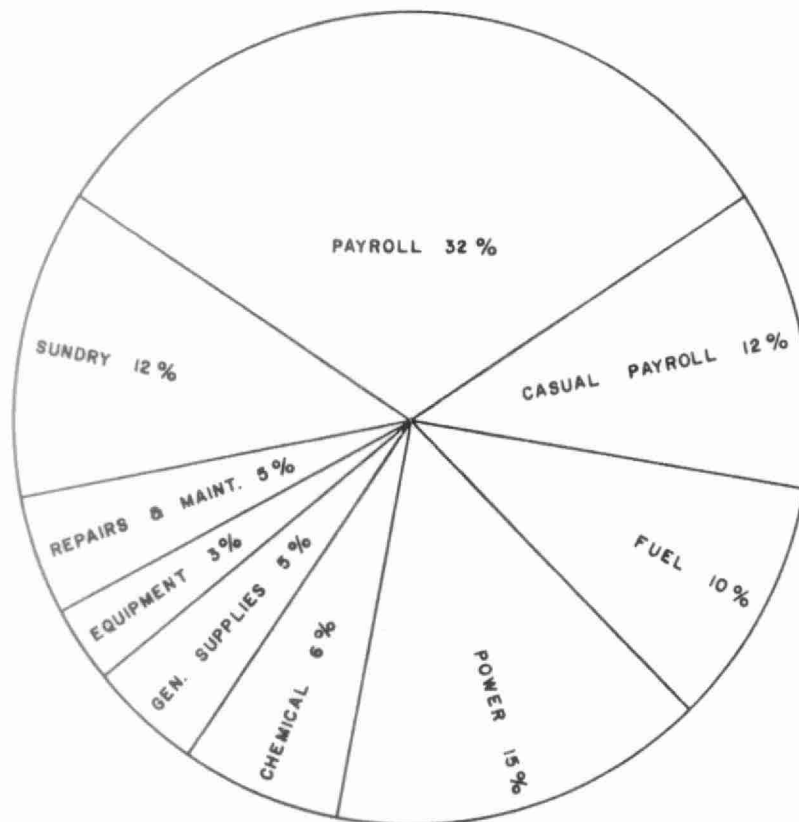
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY
JAN	1075.72	714.12		324.89			36.71			
FEB	1740.42	714.12		438.55	455.60		33.93			98.22
MARCH	2642.25	714.12		611.57	386.89	28.60	181.67	14.75	17.98	686.67
APRIL	1812.12	778.14		488.84	346.00		28.83		133.32	36.99
MAY	2357.23	1088.86	293.76	331.99	379.86	12.90	123.32		.79	125.75
JUNE	3251.80	814.87	325.76	142.40	442.73	1009.40	172.83	94.90	76.41	172.50
JULY	4102.73	763.52	510.34		443.92		142.62	234.76	68.84	1938.73
AUG	3361.27	1020.38	848.78	130.30	424.51		190.01	86.31	393.44	267.54
SEPT	3328.52	469.08	651.70	106.80	457.58	1009.40	264.39	248.09	90.52	30.90
OCT	3022.43	651.69	902.96	197.94	451.44		51.37	218.47	377.57	170.99
NOV	2107.69	1002.31	176.02		442.13		190.33	12.78	235.79	48.33
DEC	2199.12	1104.58		344.17	470.45		51.42	49.13	70.93	108.44
TOTAL	31001.30	9835.79	3709.38	3117.45	4701.11	2060.30	1467.43	959.19	1465.59	3685.06

YEARLY OPERATING COSTS

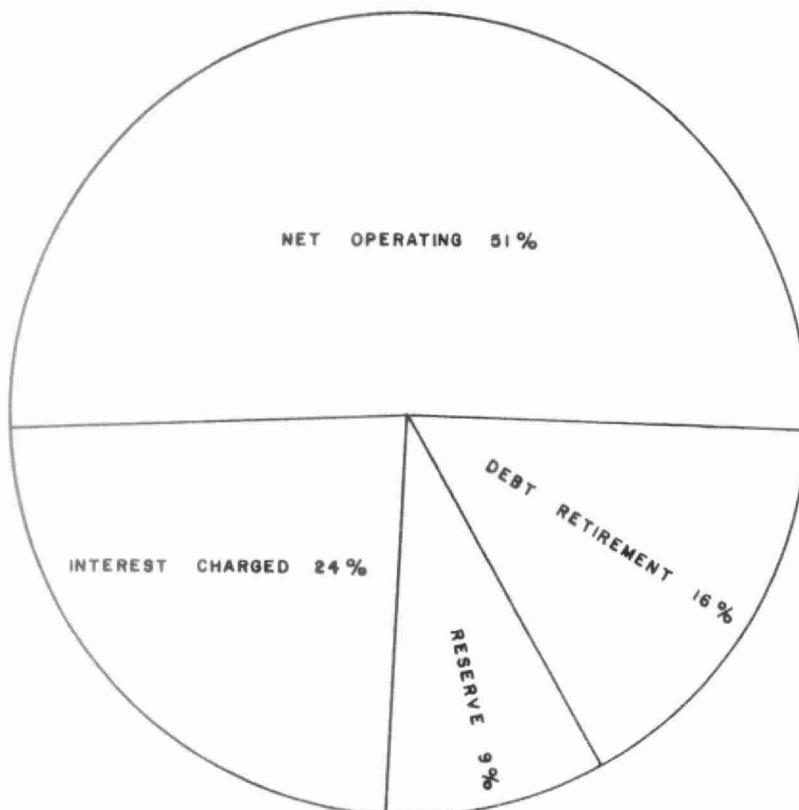
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1965	1061.286	\$31001.30	* \$4.17	\$29.21	3 CENTS

* BASED ON ESTIMATED ANNUAL POPULATION AND 3.9 PERSONS PER FAMILY

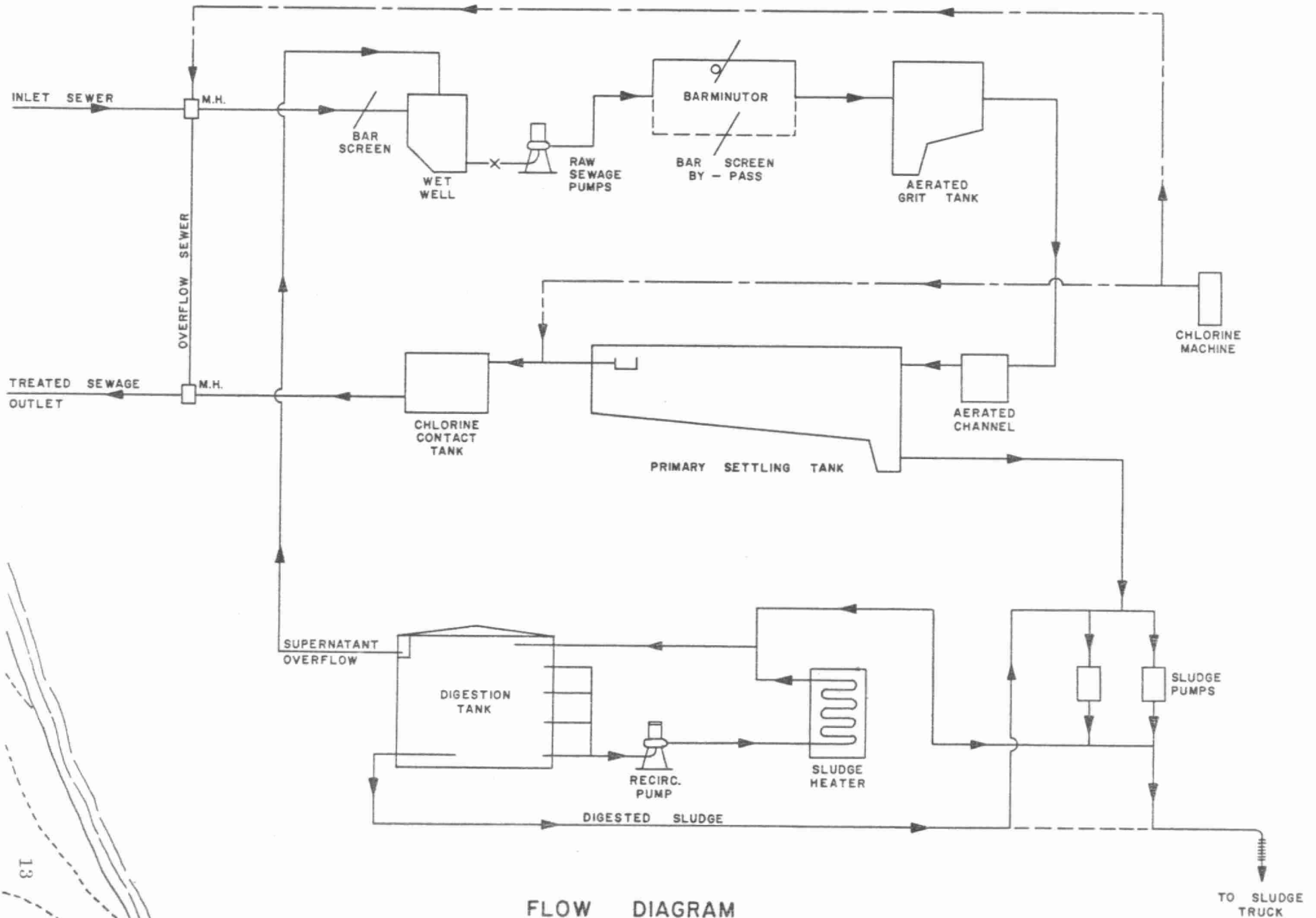
1965 OPERATING COSTS



TOTAL ANNUAL COST



**Technical
Section**



Design-Data

GENERAL

Type of Plant - Primary treatment

Design Population - 30,000 persons

Per Capita Flow - 100 GPD

Average Design Plant Flow 3,000 GPD

Maximum Design Plant Flow - 9,000,000 GPD (3 DWF)

Five Day BOD -

Raw Sewage - 180 ppm

Removal - 35-40%

Suspended Solids -

Raw Sewage - 200 ppm

Removal - 60-65%

Receiving Stream -

Mattagami River

INFLUENT WORKS

Influent Pipe

36 inch diameter trunk sewer. Capacity 14.0 MGD.

By-pass Manhole

Overflow type into 36 inch diameter pipe to outfall manhole and thence into 36 inch diameter outfall pipe. Flows in excess of 9.0 mgd will by-pass plant.

Coarse Bar Screen

30, 2" x 1/4" steel bars equally spaced at 2 inch centres.

Screening

One Model C-36 inch Barminutor, Manufactured by the Chicago Pump Company.

A Cema type four control panel for automatic control of unit.

Two overflow weirs installed on either side of Barminutor channel to by-pass flows in excess of 9.0 mgd.

Coarse bar screen in by-pass channel. 21, 2" x 1/4" steel bars equally spaced at 2 inch centres.

Grit Removal

The grit will be removed by an aerated grit tank.

Dimension of tank - 13'-0" x 18'-9" x 12'-6"

Liquid volume - 19,000 imperial gallons

Detention period - at 3.0 mgd - 9.1 min.
at 9.0 mgd - 3.03 min.

Air supply - 2 blowers in main control building.

PRIMARY SEDIMENTATION TANKS

Number of tanks - 2 (rectangular)

Dimension of each tank - 125' x 20' x 12' (av. liquid depth)

Total volume - 374,000 gallons

Detention period at design flow (3 mgd) 3.0 hours

Surface settling rate at (3 mgd) - 600 gals/sq. ft. of tank/day.

Weir overflow rate at (3 mgd) - 9,900 gals/lin. ft. of weir/day.

Sludge Collectors

2 longitudinal falk sludge collectors.

Flights are projected above water surface in order to move surface sum to scum trough.

Raw Sludge Pumping

Two heavy duty Marlow plunger type raw sludge pumps in main control building. Capacity of each pump - 50 gpm @ 50 TDH. Control - program timing equipment for automatic operation of sludge pumps and sludge collectors.

Scum Removal

Scum pumped to digester by Wemco horizontal torque flow pump. Capacity- 80 gpm @ 35' TDH. Motor - 5hp, electric, with constant torque drive.

Baffling

2 inch creosoted timber baffles installed to reduce turbulence at the influent to the primary tanks.

CHLORINATION

Chlorine Contact Chamber

Dimensions - 2 (47'-6" x 7'-0" x 9'-7.2")
(Average liquid depth)

Volume - 37,400 gallons

Contact period at 3.0 MGD

19 minutes + 6.0 minutes detention in outfall pipe.

Contact period at 9.0 MGD

9.0 minutes + 2.0 minutes detention in outfall pipe

Chlorinator

Fischer & Porter vacuum type with mechanical diaphragm, capable of operation proportional to the rate of flow.

Maximum Capacity

2,000 lbs. per day at maximum flows of 9.0 mgd.

OUTFALL SEWER

294' of 36" diameter pipe

Maximum Capacity

24.0 mgd @ head of 1.36'

Velocity of Flow

3.0 mgd - 0.8 ft./sec.

9.0 mgd - 2.4 ft./sec.

DIGESTER SYSTEM

One digester - 65' in diameter by 24' high, employing single stage digestion. Volume - 80,000 cubic feet

Digester Loading

2.66 cubic feet per capita

1.35 lbs. solids per cubic foot of tank per month

Sludge Heater

500,000 B. T. U. 's per hour

Burner is capable of automatically burning either sludge gas or fuel oil.

RAW SEWAGE PUMPS

One vertical centrifugal pump driven by variable speed drive electric motor.

Capacity - 3,650 gpm = 5.25 mgd @ TDH of 26 feet.

Speed - 1100 RPM

One vertical centrifugal pump driven by a squirrel cage constant speed drive electric motor.

Capacity - 3,120 gpm = 4.5 mgd @ TDH of 26 feet.

Speed - 1150 RPM

One vertical centrifugal pump driven by a diesel engine through a right angle gear drive with provisions for installing an electric motor at a future date.

Capacity - 3,120 gpm = 4.5 mgd @ TDH of 26 feet.

Speed - 1150 RPM

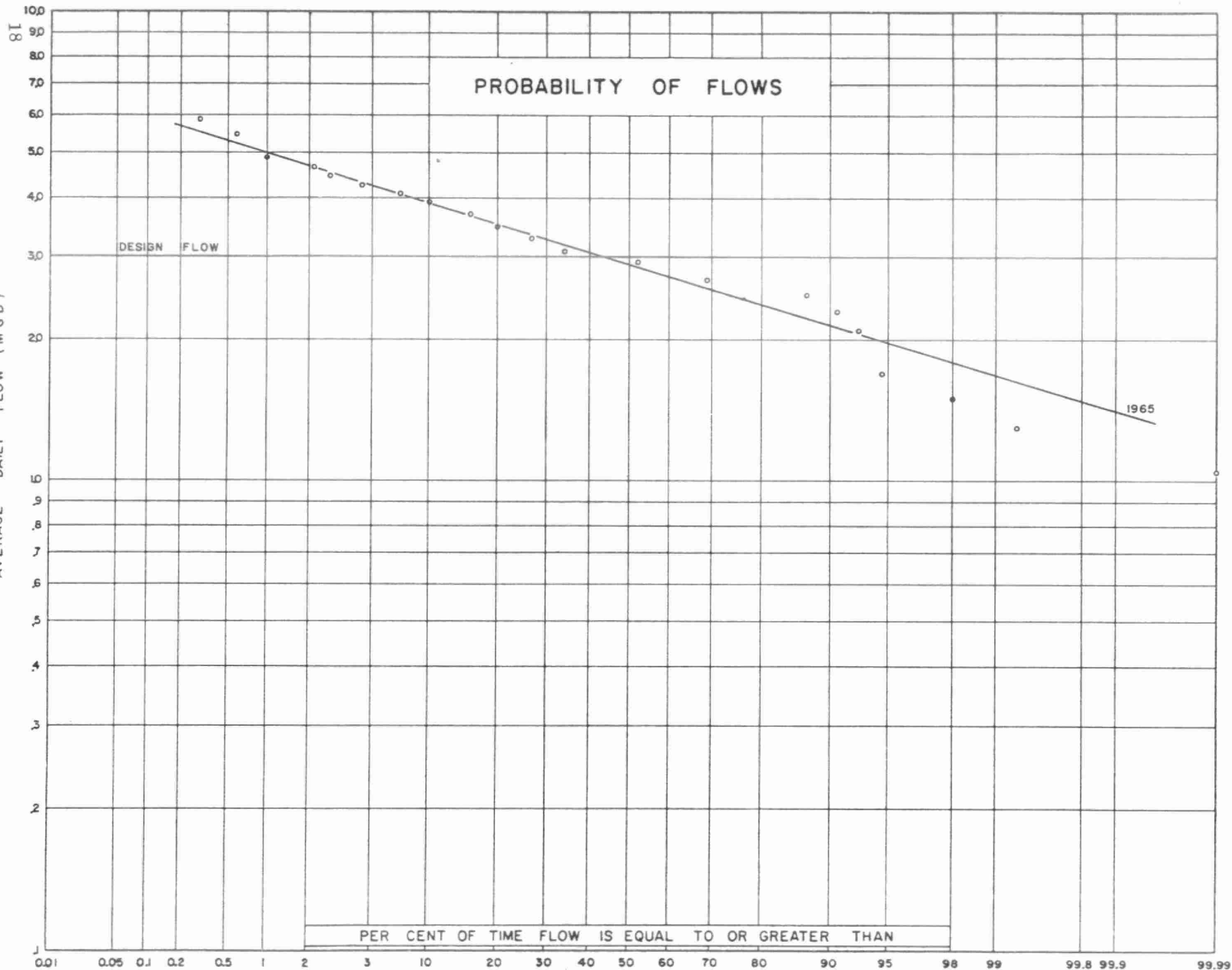
Process Data

Sewage flows to the Timmins WPCP in January and February were prorated, based on average daily flows in the latter ten months of the year.

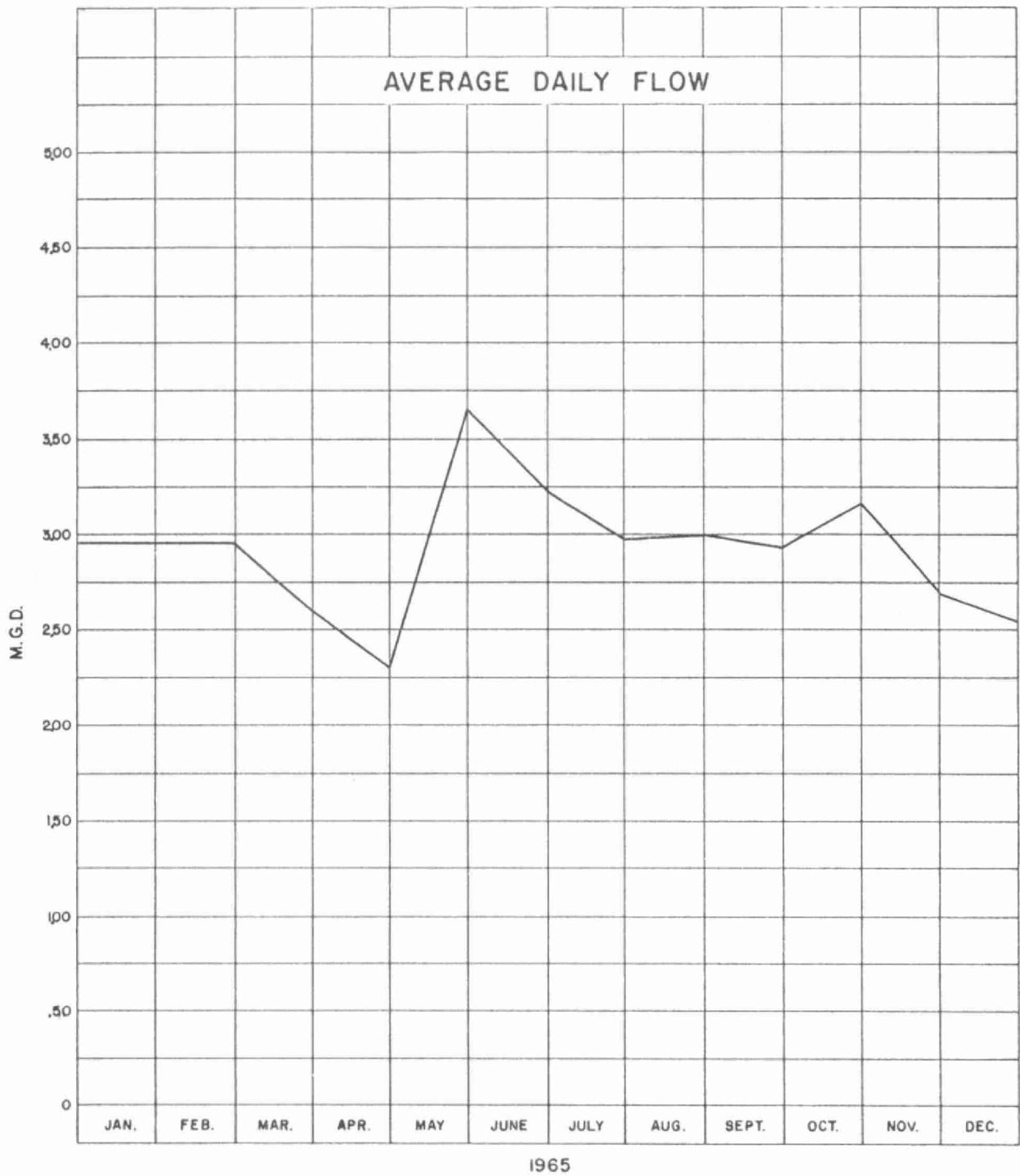
From the probability of daily flow curve it may be noted that 44 percent of the time flows were equal to or greater than the average design flow of the plant. It may also be noted that at no time during the year did flows reach the maximum design capacity of the plant.

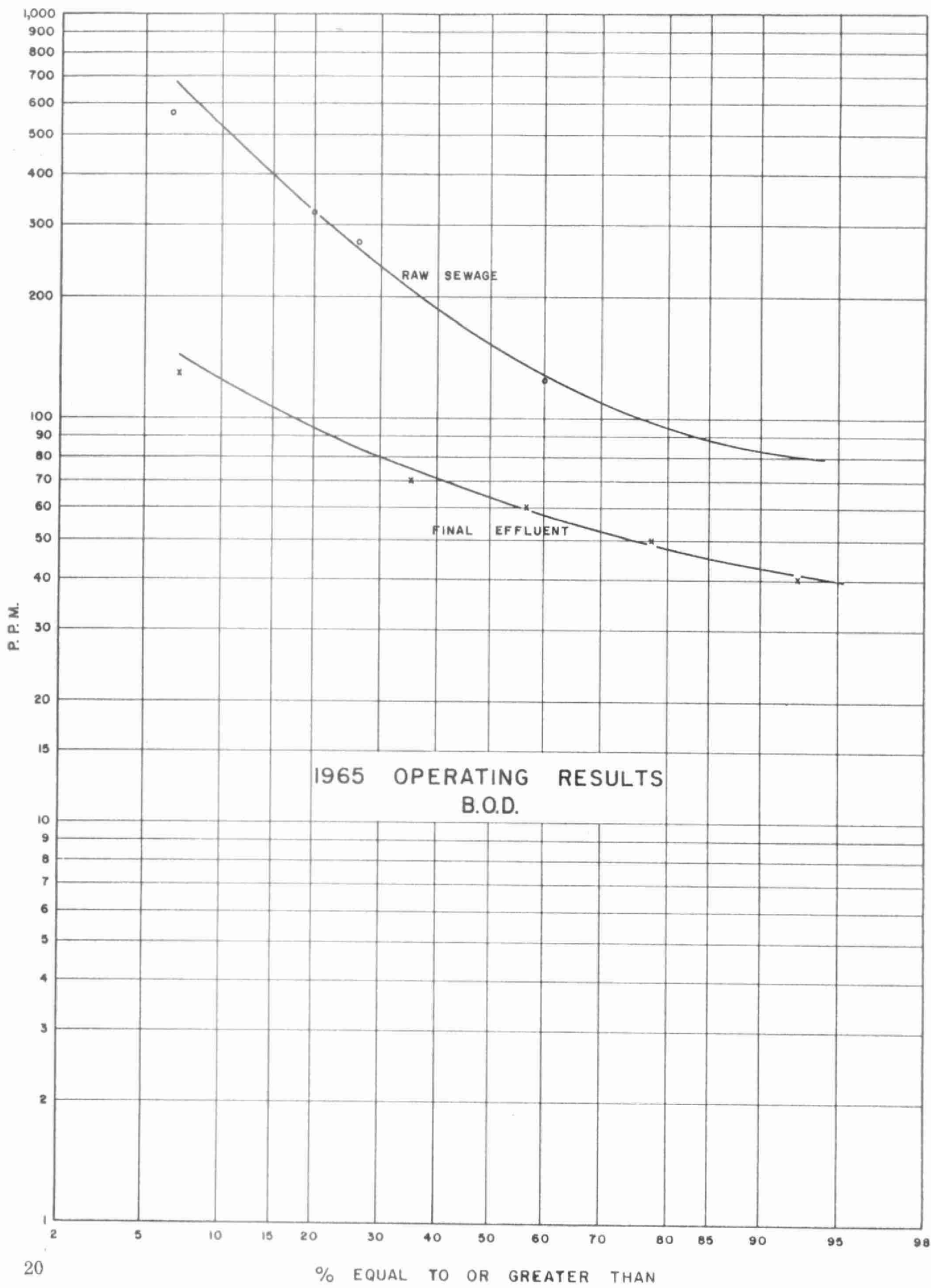
PROBABILITY OF FLOWS

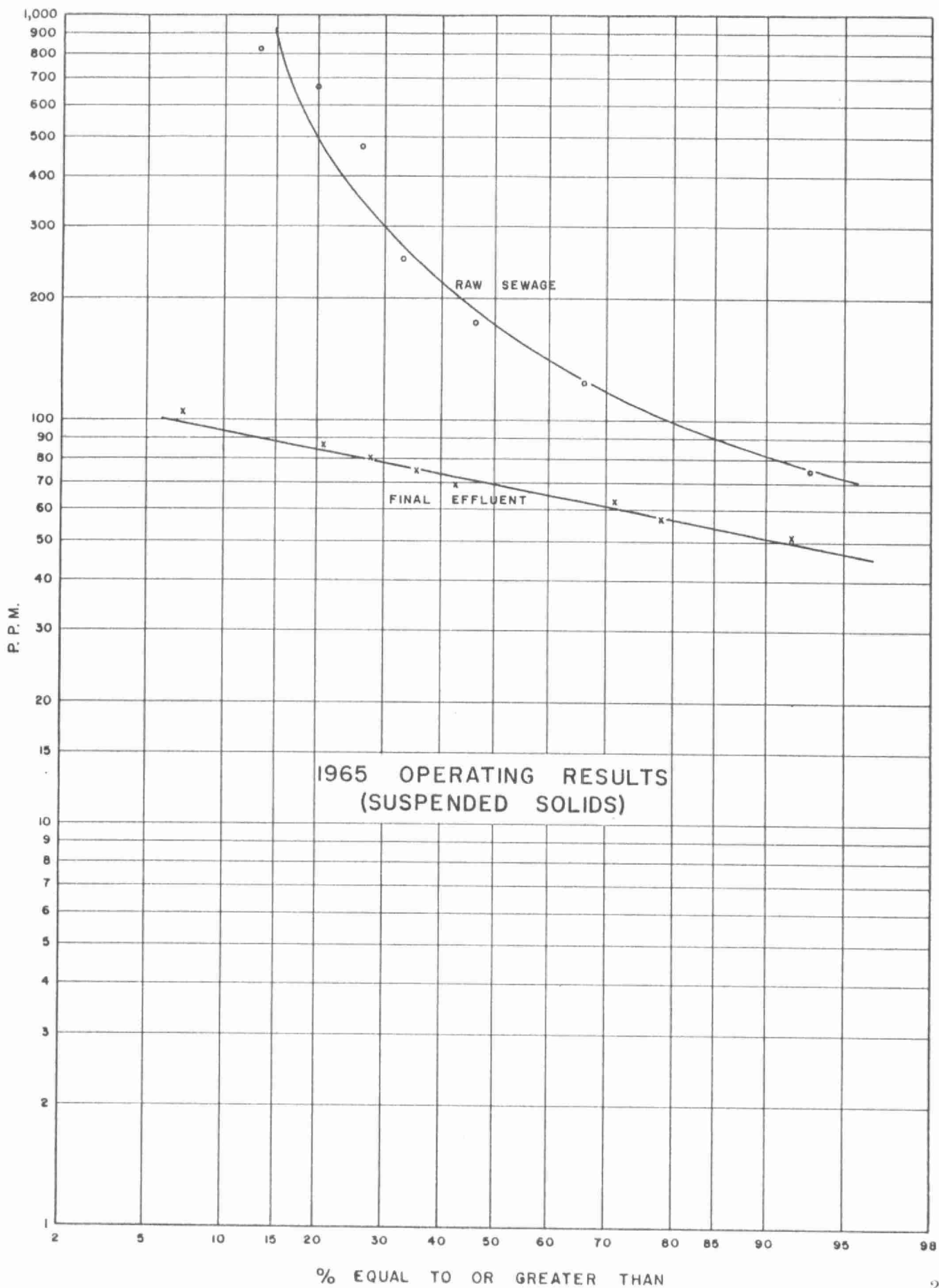
AVERAGE DAILY FLOW (MGD)

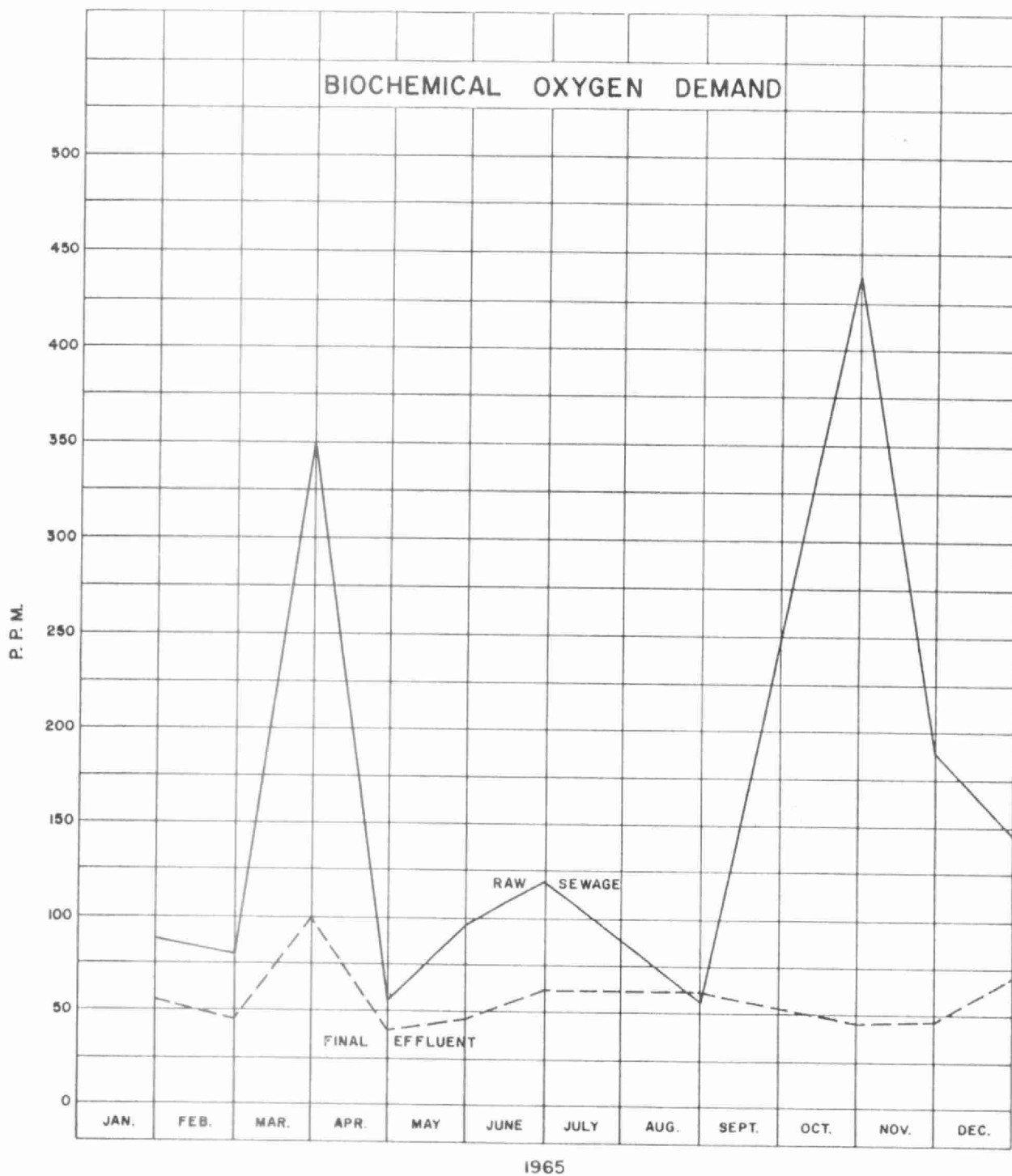


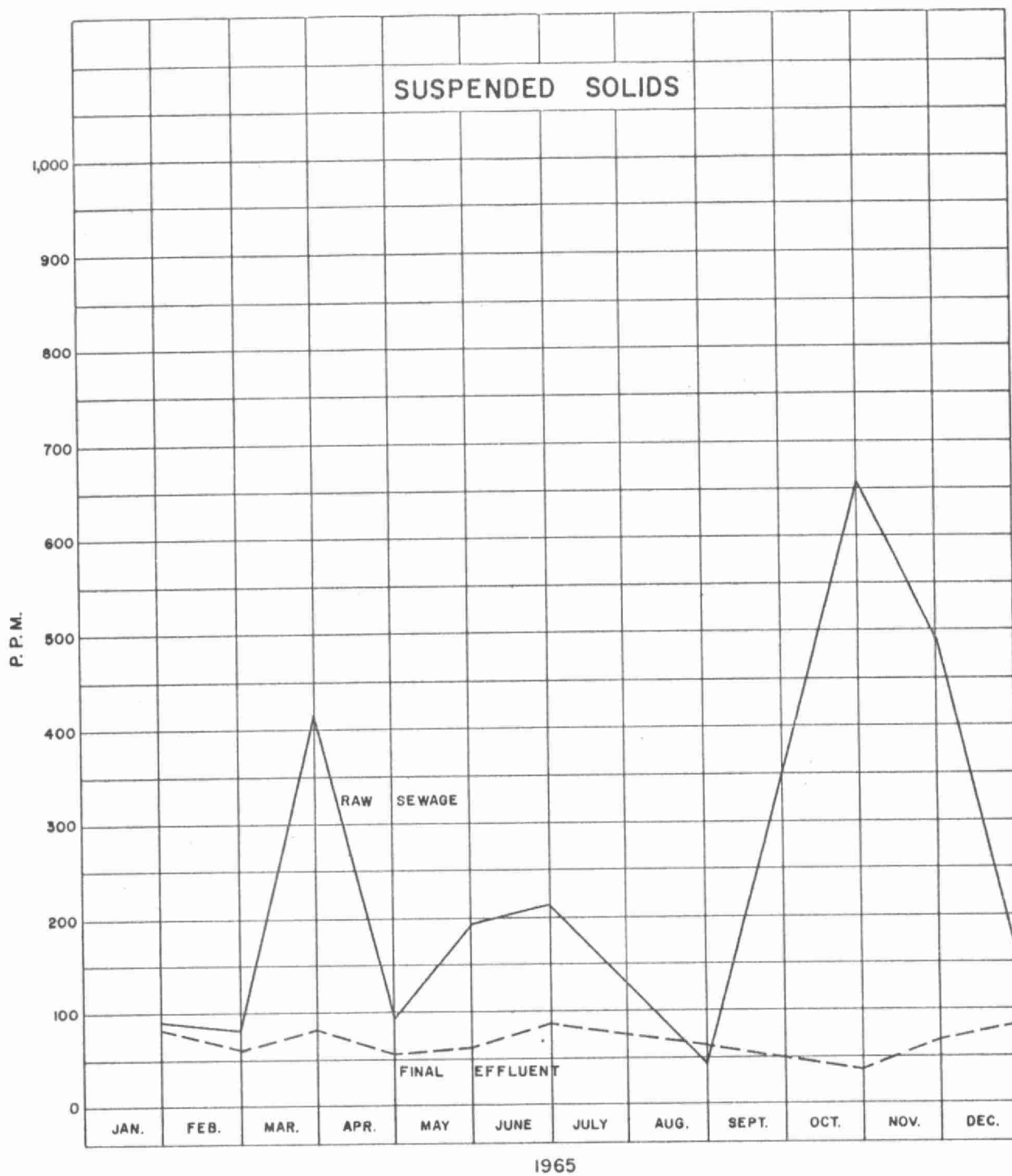
PER CENT OF TIME FLOW IS EQUAL TO OR GREATER THAN











GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	90	59	34.5	14.0	94	83	11.5	5.0	15.5
FEB.	82	48	41.5	13.8	87	64	26.5	9.4	14.3
MAR.	350	100	71.5	101.1	415	85	79.5	133.4	16.1
APR.	57	43	24.5	4.8	98	59	39.5	13.5	15.0
MAY	98	48	51.0	28.3	146	62	57.5	47.5	155.0
JUNE	120	64	46.5	27.3	166	88	47.0	38.0	150.0
JULY	*163	60	63.0	47.5	*236	70	70.5	76.5	157
AUG.	59	67	0.0	0.0	48	65	0.0	0.0	155
SEPT.	*163	60	63.0	45.2	*236	70	70.5	72.8	150
OCT.	440	48	89.0	191.5	662	40	94.0	303.8	155
NOV.	190	49	74.0	56.6	495	70	86.0	170.7	140
DEC.	145	72	50.5	28.5	150	87	42.0	24.6	107
TOTAL	-	-	-	546.6	-	-	-	880.9	1229.9
AVG.	163	60	63.0	45.6	236	70	70.5	73.4	102.5

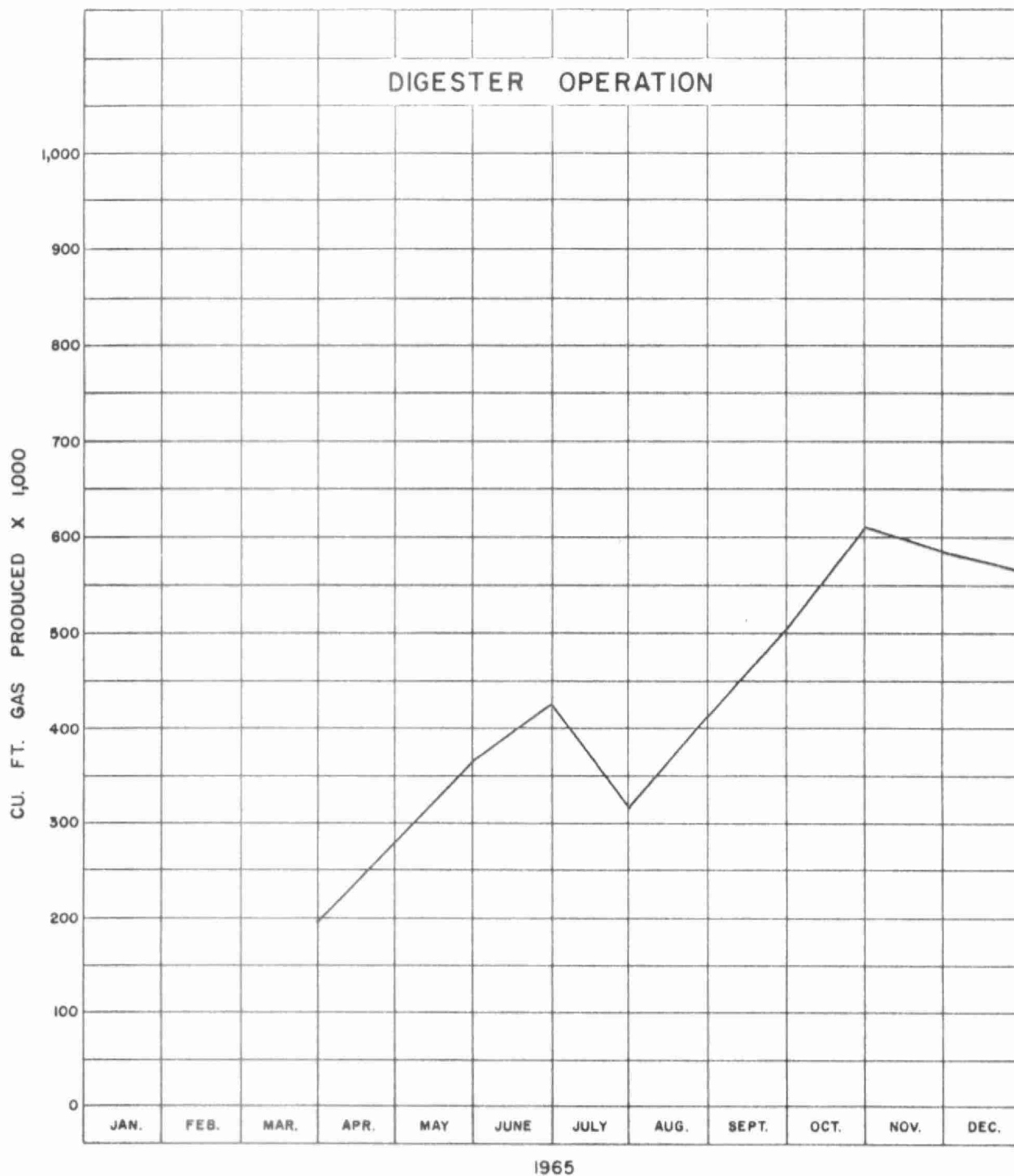
* Average values substituted. No samples.

COMMENTS

The average BOD of the raw influent directed to the plant was 163 ppm and of the final effluent 60 ppm. This represents a removal efficiency of 63.0%. The design BOD of the plant and removal efficiency is respectively 180 ppm and 35 - 40%.

The average concentration of suspended solids was 236 ppm in the raw sewage and 70 ppm in the final effluent, representing a 70.5 percent reduction. The design concentration and the removal efficiency of suspended solids is respectively 200 ppm and 60 - 65%.

During the year a total quantity of 546.6 tons of BOD and 880.9 tons of suspended solids were removed by the plant processes. A total of 1,229.9 cu. ft. of grit was removed.



DIGESTER OPERATION

Month	Sludge to Digesters 1000's cu. ft.	Gas Produced 1000's cu. ft.
January	54.38	
February	45.23	
March	50.08	195.94
April	48.46	280.55
May	50.08	365.31
June	48.46	425.47
July	50.08	314.22
August	50.08	414.23
September	48.46	502.19
October	50.08	611.89
November	48.46	585.43
December	50.08	566.97
TOTAL	**593.93	*4262.20
AVERAGE	49.49	426.22

* Ten months data

** 35 gpm pump rate used

COMMENTS

In 1965 the total quantity of raw sludge pumped to the digester was 593,930 cubic feet. The total quantity of digester gas measured was 4,262,200 cubic feet. No gas measurements were taken during the months of January and February.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	(A) 90.148	-	-
FEBRUARY	(A) 81.424	-	-
MARCH	80.873	-	-
APRIL	69.240	-	-
MAY	113.137	2616	3.98
JUNE	97.421	4760	4.89
JULY	92.212	4910	5.32
AUGUST	92.887	6910	7.44
SEPTEMBER	87.720	5320	7.28
OCTOBER	97.702	6820	6.98
NOVEMBER	80.323	210	7.84
DECEMBER	78.199	-	-
TOTAL	1061.286	31546	-
AVERAGE	88.440	5258	6.27

(A) Total includes prorated Jan. and Feb. flows at 2.908 mgd.

* 18 days of chlorination

** 25 days of chlorination

COMMENTS

The treated effluent from the plant is chlorinated during the summer and fall months of the year. Chlorination begins in May and ends in November.

A residual of 0.5 ppm is maintained to reduce the bacterial count in the final effluent.

LABORATORY LIBRARY



96936000119587

CONCLUSIONS

During 1965, Timmins Water Pollution Control Plant operated in a satisfactory manner.

